



Jeongbhin Seo, Ph.D.

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🌐 <https://jeongbhin.github.io/>





Employment History

- 2023.12 –  **Postdoctoral Researcher**, Los Alamos National Laboratory, Theoretical Division
Advisor: Dr. Fan Guo, Dr. Hui Li
- 2022.9 – 2023.11  **Postdoctoral Researcher**, Department of Physics, Ulsan National Institute of Science & Technology.
Advisor: Prof. Dongsu Ryu

Education






- 2018.09 – 2022.08  **Ph.D., Pusan National University** Earth Science.
Advisor: Prof. Hyesung Kang
Thesis title: *A Simulation Study of Ultra-relativistic Jets*.
- 2015.03 – 2018.02  **M.Sc., Pusan National University** Earth Science.
Advisor: Prof. Hyesung Kang
Thesis title: *The Contribution of Stellar Winds to Cosmic Ray Production*.
- 2008.03 – 2012.02  **B.Ed., Pusan National University** Earth Science Education.


Awards and Fellowships

- 2021  **Busan Future Scientist Award**, Federation of Busan Science and Technology
- 2020-2022  **Research grant for doctoral students**, The National Research Foundation of Korea


Research Publications

Journal Articles

- 1 **J. Seo** and D. Ryu, “HOW-MHD: A High-order WENO-based Magnetohydrodynamic Code with a High-order Constrained Transport Algorithm for Astrophysical Applications,” *Astrophysical Journal*, vol. 953, no. 1, 39, p. 39, Aug. 2023.  DOI: 10.3847/1538-4357/acdf4b.
- 2 **J. Seo**, D. Ryu, and H. Kang, “A Simulation Study of Ultra-relativistic Jets. III. Particle Acceleration in FR-II Jets,” *Astrophysical Journal*, vol. 944, no. 2, 199, p. 199, Feb. 2023.  DOI: 10.3847/1538-4357/acb3ba.
- 3 **J. Seo**, D. Ryu, and H. Kang, “Model Spectrum of Ultra-High-Energy Cosmic Rays Accelerated in FR-I Radio Galaxy Jets,” *submitted to ApJ*, Oct. 2023.  DOI: 10.48550/arXiv.2310.03231.
- 4 **J. Seo**, H. Kang, and D. Ryu, “A Simulation Study of Ultra-relativistic Jets. II. Structures and Dynamics of FR-II Jets,” *Astrophysical Journal*, vol. 920, no. 2, 144, p. 144, Oct. 2021.  DOI: 10.3847/1538-4357/ac19b4.
- 5 **J. Seo**, H. Kang, D. Ryu, S. Ha, and I. Chattopadhyay, “A Simulation Study of Ultra-relativistic Jets-I. A New Code for Relativistic Hydrodynamics,” *Astrophysical Journal*, vol. 920, no. 2, 143, p. 143, Oct. 2021.  DOI: 10.3847/1538-4357/ac19b3.






- 6 J. Seo, H. Kang, and D. Ryu, "The Contribution of Stellar Winds to Cosmic Ray Production," *Journal of Korean Astronomical Society*, vol. 51, no. 2, pp. 37–48, Apr. 2018.  DOI: 10.5303/JKAS.2018.51.2.37.

Conference Proceedings








- 1 J. Seo, H. Kang, and D. Ryu, "A New Code for Relativistic Hydrodynamics and its Application to FR II Radio Jets," vol. 362, Jan. 2023, pp. 87–93.  DOI: 10.1017/S1743921322001314.

Conferences





International Conferences

- 2023.07  "Generation of Ultra-High Energy Cosmic Rays at Radio Galaxy Jets".
ICGAC15, Gyeongju, South Korea, Talk
- 2023.06  "A New WENO Magnetohydrodynamic Code with a High-Order Constrained Transport Scheme".
2023 ASTRONUM, Pasadena, CA, USA, Poster
- 2022.09  "Particle acceleration at relativistic jets of FR-II radio galaxies".
2022 IAUGA, Busan, South Korea, Poster
- 2022.06  "Relativistic Hydrodynamic Simulations of Ultra-relativistic Jets in the Intracluster Medium".
2022 EAS, Valencia, Spain, Poster
- 2021.11  "A New Code for Relativistic Hydrodynamics and its Application to FR II Radio Jets".
IAU Symposium 362: Computational astrophysics, Online, Talk






Domestic Conferences

- 2023.10  "Radio Galaxies as the Origin of Ultra-High-Energy Cosmic Rays".
2023 108th KAS Fall Meeting, Jeju, South Korea, Talk
- 2023.04  "A New Magnetohydrodynamic Code with a High-Order Constrained Transport Scheme".
2023 107th KAS Spring Meeting, Jeonju, South Korea, Talk
- 2022.04  "Acceleration of Ultra-high Energy Cosmic Rays at Relativistic Jets".
2022 105th KAS Spring Meeting, Busan, South Korea, Talk
- 2021.10  "FR-II radio jets and the acceleration of UHECRs".
2021 104th KAS Fall Meeting, Jeju, South Korea, Talk
- 2021.04  "Structures and Energetics of Flows in Ultra-relativistic Jets".
2021 103th KAS Spring Meeting, Online, South Korea, Talk
- 2020.10  "A New Code for Relativistic Hydrodynamics".
2020 102th KAS Fall Meeting, Online, South Korea, Poster
-  "Morphology and Dynamical Properties of Ultra-Relativistic Jets".
2020 102th KAS Fall Meeting, Online, South Korea, Talk



Seminars and Colloquium

- 2023.11  "Radio Galaxies as the Origin of Ultra-High-Energy Cosmic Rays".
71st GWN Workshop, Daejeon, South Korea
- 2023.03  "Acceleration of Ultra-High Energy Cosmic Rays at Radio Galaxy Jets".
Max-Planck institute: The VLBI Group Seminar, Online, Germany
- 2023.01  "A Simulation Study of Radio Galaxy Jets".
2023 SKA-Korea Workshop, Cheonan, South Korea
- 2022.12  "Particle Acceleration in Radio Galaxy Jets".
6th CHEA Workshop, Cheonan, South Korea




Conferences (continued)

- 2022.09  “An introduction to relativistic hydrodynamics simulation and its application”.
66th GWNR Workshop. Pohang, South Korea
- 2021.12  “FR-II radio jets and the acceleration of UHECRs”.
Korea young Astronomers Meeting Colloquium. Online, South Korea
- 2021.11  “FR-II radio jets and the acceleration of UHECRs”.
5th CHEA Workshop. Busan, South Korea
- 2020.01  “A simulation study of ultra-relativistic jets”.
4th CHEA Workshop. Busan, South Korea
- 2019.01  “The contribution of Stellar Winds to Cosmic Ray Production”.
3rd CHEA Workshop. Gyeongju, South Korea




Collaboration

- 2019 –  **Center for High Energy Astrophysics (CHEA)**
Ulsan National Institute of Science & Technology, South Korea
- 2022 –  **Wombat User Group**
University of Minnesota, USA







Skills

- Languages  English, Korean
- Coding  Fortran, Python, IDL, \LaTeX , OpenMP, MPI
- Research  Particle acceleration, Relativistic Jets, Collisionless Shock, Astrophysical Turbulence, Galaxy Cluster, Hydrodynamics (HD), Relativistic Hydrodynamics (RHD), Magneto-Hydrodynamics (MHD), Monte-Carlo simulation, Simulation code development





High Performance Computing

- 3M CPU Times  CHEA Cluster, MHD, RHD, Monte-Carlo Simulation
- 2M CPU Times  UNIST Supercomputing Center, RHD Simulation
- 0.5M CPU Times  PNU Cluster, HD, RHD, Monte-Carlo Simulation



Public Outreach

- 2023.08  “The Theory and Practice of Astronomical Observation”.
Physics Festival for High School students, Ulsan, South Korea
- 2023.07  “Relativistic hydrodynamics and a simulation study of ultra-relativistic jets”.
Numerical relativity and gravitational wave summer school, Daejeon, South Korea
- 2023.05  “Path to Becoming an Astrophysicist”.
Gaeun Middle School, Yangsan, South Korea
-  “Path to Becoming an Astrophysicist”.
Muryong High School, Ulsan, South Korea
- 2023.01  “Solving partial differential equations using numerical methods”.
Numerical relativity and gravitational wave winter school, Ulsan, South Korea
- 2022.11  “From a science teacher to an astrophysical researcher”.
PNU Future Education Center, Busan, South Korea



Public Outreach (continued)

- 2022.10  "What does an astrophysicist do?".
 Gaeun Middle School, Yangsan, South Korea
- 2022.07  "Career Mentoring Program - Astrophysicist".
 PNU Future Education Center, Busan, South Korea
- 2021.12  "The usage of coding in astrophysics".
 Mulgeum High School, Yangsan, South Korea
- 2021.11  "What does an astrophysicist do?".
 Muryong High School, Ulsan, South Korea

Academic services

- 2023.03 – 2023.11  **Workshop Organizer**
 68th-71st Workshop on Gravitational Waves and Numerical Relativity
- 2023.05 – 2023.11  **Workshop Organizer**
 2023 Korea Numerical Astrophysics Group Workshop

Teaching Experience

- 2012.03 -2019.08  **High/Middle School Science Teacher**
 Gyeongsangnam-do Office of Education, South Korea
- 2020.03 -2022.08  **Teaching Assistant**
 Pusan National University, South Korea